each fully surround the respective cooling tube **50**. Clearances **80** and **82** may be from 4 millimeters to 12 millimeters. In a refinement, clearance **80** and **82** may be approximately 8 millimeters, and still more particularly approximately 7.9 millimeters, within measurement error. It will be appreciated that as cooling tube **50** expands and shrinks in response to temperature changes, and experiences vibrations, bending loads or twisting loads, the clearances or gaps **80** and **82** can prevent interference between the respective parts that can lead to material stress, fatigue failure, deformation, cracking, or other problems. It can also be noted yet another clearance **84** extends between clamping plate **64** and header **44**. As bolts **66** are rotated into engagement with header **44**, seal retainer **72** can be clamped down against pack seal **70** to a specified clamping load, squeezing pack seal **60** radially inward, radially outward, and axially between header **44** and seal retainer **72**. Providing clearance **84** can enable a controlled clamping load to be applied without bottoming out based on contact between clamping plate **64** and header **44**. Still other features of header assembly **38** are shown in FIG. **5**, and it can be noted that cooling tube **50** defines a longitudinal axis **100** extending between inlet tube end and outlet tube end **54**, and forms a plurality of flow passages **51**, in a single row in cooling tube **50** and arranged side-by-side. Cooling tube **50** can include a one-piece extrusion, for example, formed of aluminum. In other embodiments, a greater number of flow passages, or only one or two flow passages might be employed. Moreover, a header assembly as contemplated herein could include only one cooling tube, with or without attached heat dissipation fins, or a greater number of cooling tubes than illustrated in the attached drawings, such as eight, ten, twenty or still more.

INDUSTRIAL APPLICABILITY

[0019] When machine system **10** is operated in service, turbocharger **18** is rotated based upon an exhaust output of machine **12** to rotate compressor **20**, and feed compressed air increased in temperature into inlet tank **42**. The temperature of compressed air supplied to inlet tank **42** can be increased from an ambient temperature by hundreds of degrees C., for example up to at least 250° C. The hot compressed air is then fed through cooling tubes **50** to exchange heat with a flow of cooling air produced by fan **34**. The compressed air that is cooled is fed to outlet tank **36** and then to cylinders **17** for combustion.

[0020] As discussed above the thermal stress and other conditions experienced by certain components of cooler **40**, including header assembly **38** during service, can be severe. The relatively high temperatures, temperature changes, expansion and contraction of materials, shocks, loads, vibrations, et cetera, render the requirements for supporting cooling tubes **50** in header **44** quite stringent, if cracking or other problems are to be avoided. It will be recalled that pack seals **60** provide for fluid sealing between header **44** and cooling tubes **50** to avoid leakage of compressed air, while still allowing cooling tubes **50** to expand, contract, twist, bend, etc., by way of clearances between cooling tubes **50** and clamping plate **64** and header **44**. Even during such conditions, pack seals **60** can flex to maintain the fluid sealing of the joints between header **44** and cooling tubes **50**. It should also be appreciated that the disclosed range for the size of clearance **80** enables the desired flexibility of the joint supporting cooling tube **50** while also providing a desired clamping load and clamping pattern upon each pack seal **60**. In other words, the size of clearance **80** can be understood to balance providing a suitable clamping load in a suitable clamping direction upon pack seal **60**, while also accommodating the desired flexibility in the joint formed between cooling tube **50** and header **44**.

[0021] The present description is for illustrative purposes only, and should not be construed to narrow the breadth of the present disclosure in any way. Thus, those skilled in the art will appreciate that various modifications might be made to the presently disclosed embodiments without departing from the full and fair scope and spirit of the present disclosure. Other aspects, features and advantages will be apparent upon an examination of the attached drawings and appended claims. As used herein, the articles "a" and "an" are intended to include one or more items, and may be used interchangeably with "one or more." Where only one item is intended, the term "one" or similar language is used. Also, as used herein, the terms "has," "have," "having," or the like are intended to be open-ended terms. Further, the phrase "based on" is intended to mean "based, at least in part, on" unless explicitly stated otherwise.

What is claimed:

1. A machine system comprising:

a compressor having an air inlet, and a compressed air outlet;

a cooler including an inlet tank, a header attached to the inlet tank and having an inlet header side and a second header side opposite to the inlet header side, and a cooling tube;

the cooling tube including an inlet tube end supported in the header and opening to the inlet tank and an outlet tube end arranged to feed cooled air to a machine in the machine system, and the cooling tube having at least one external heat exchange surface exposed to a flow of cooling air between the inlet tube end and the outlet tube end; and

the cooler further including a pack seal extending peripherally around the cooling tube, and a clamping assembly coupled to the second header side and clamping the pack seal against the header, such that the pack seal is squeezed into sealing contact with each of the cooling tube and the header.

2. The machine system of claim **1** wherein the pack seal is formed of flexible graphite packing material.

3. The machine system of claim **1** wherein the clamping assembly includes a clamping plate and a plurality of clamping bolts received in the header.

4. The machine system of claim **3** wherein a seal cavity is formed in the header and the pack seal is positioned within the seal cavity.

5. The machine system of claim **4** wherein the cooler further includes a seal retainer sandwiched between the clamping plate and the pack seal.

6. The machine system of claim **5** wherein a first clearance extends between the cooling tube and the seal retainer, and a second clearance larger than the first clearance extends between the cooling tube and the clamping plate.

7. The machine system of claim **6** wherein the second clearance is from 4 mm to 12 mm.

8. The machine system of claim **1** wherein:

a plurality of flow passages are formed in the cooling tube;